Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method of embedding a digital watermark information $b_1 - b_n$ ($2 \leq n$) in image data, comprising steps of:

dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

defining an area G consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

allocating each of the areas S constituting said area G to some one of: areas $T_1 - T_n$ whose pixel values are changed and areas H_1 - H_m ($1 \leq m$) whose pixel values are not changed;

corresponding each of said $T_1 - T_n$ whose pixel values are changed, to each of said digital watermark information $b_1 - b_n$ and changing the pixel value of each area T according to a bit value;

locating areas $T_1 - T_n$ and areas $H_1 - H_m$ in a predetermined same arrangement in said area G; and

locating said area G repeatedly over entire image data, wherein

said location of said area G thus located repeatedly being independent of said digital watermark information.

2. (currently amended) A method of embedding digital watermark information $b_1 - b_n$ ($2 \leq n$) in image data, comprising the steps of:

dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

defining an area G consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

allocating each of the areas S constituting said area G to some one of: areas $T_1 - T_n$ whose pixel values are changed, areas $J_1 - J_k$ ($1 \leq k$) in which information $p_1 - p_k$ ($1 \leq k$) specifying an embedding format for embedding said digital watermark information $b_1 - b_n$ in said areas $T_1 - T_n$, and areas $H_1 - H_m$ ($1 \leq m$) whose pixel values are not changed;

corresponding each of said $T_1 - T_n$, whose pixel values are changed, to each of said digital watermark information $b_1 - b_n$ and changing the pixel value of each area T according to a bit value;

locating areas $T_1 - T_n$, areas $J_1 - J_k$ and areas $H_1 - H_m$ in a predetermined same arrangement in said area G; and

locating said area G repeatedly over entire image data, wherein

said location of said areas G thus located repeatedly being independent of said digital watermark information.

3. (original) The method of embedding digital watermark information according to Claim 2, wherein:

said digital watermark information $b_1 - b_n$ is embedded by increasing or decreasing pixel data values in the corresponding areas $T_1 - T_n$ according to a bit value (0, 1) of each bit of the digital watermark information $b_1 - b_n$; and

said information $p_1 - p_k$ specifying said embedding format is embedded such that said information indicates a pattern of respective increasing/decreasing directions in the area $T_1 - T_n$ for a bit value of the digital watermark information, in each area G to which the area $J_1 - J_k$ embedded with said information $p_1 - p_k$ belong.

4. (previously presented) The method of embedding digital watermark information according to Claim 1, wherein:

each of said areas G includes said areas $H_1 - H_m$ which have been predetermined in a location so as to be asymmetric in vertical and horizontal directions in the area G in question.

5. (currently amended) A method of extracting digital watermark information, for extracting the digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising the steps of:

dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S;

recognizing a plurality of areas G each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas G being repeatedly located on the entire said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S;

in each of the plurality of areas G recognized, extracting information $p_1 - p_k$ ($1 \leq k$) from areas $J_1 - J_k$ in which said information $p_1 - p_k$ ($1 \leq k$) in which said information $p_1 - p_k$ ($1 \leq k$) should be embedded, said information $p_1 - p_k$ specifying an embedding format for embedding said digital watermark information $b_1 - b_n$ respectively in said areas $T_1 - T_n$;

recognizing the embedding format of the digital watermark information $b_1 - b_n$ in the areas $T_1 - T_n$ in the area G in question; and

extracting the digital watermark information $b_1 - b_n$ from the areas $T_1 - T_n$, according to the recognized embedding format

wherein said location of said areas G thus located repeatedly being independent of said digital watermark information.

6. (previously presented) A method of extracting digital watermark information, for extracting the digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising steps of:

dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels; detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S;

recognizing a plurality of areas G each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S;

in each of the plurality of areas G recognized, extracting information $p_1 - p_k$ ($1 \leq k$) from areas $J_1 - J_k$ in which said information $p_1 - p_k$ ($1 \leq k$) in which said information $p_1 - p_k$ ($1 \leq k$) should be embedded, said information $p_1 - p_k$ specifying an embedding format for embedding said digital watermark information $b_1 - b_n$ respectively in said areas $T_1 - T_n$;

recognizing the embedding format of the digital watermark information $b_1 - b_n$ in the areas T_1 - T_n in the areas G in question; and

extracting the digital watermark information $b_1 - b_n$ from the areas $T_1 - T_n$, according to the recognized embedding format.

7. (original) The method of extracting digital watermark information according to Claim 6, wherein:

for each of the plurality of groups G recognized, the information $p_1 - p_k$ embedded in the areas $J_1 - J_k$ is extracted to recognize a pattern of increasing/decreasing directions of pixel data values for a bit value of the digital watermark information, in the area G in question; and

each bit value of the digital watermark information $b_1 - b_n$ embedded in the areas $T_1 - T_n$ is detected according to the recognized pattern of increasing/decreasing directions.

8. (previously presented) The method of extracting digital watermark information according to Claim 5, wherein a plurality of areas H are detected from each of the areas G;

the detected areas H are compared with a predetermined location in the areas $H_1 - H_m$, said predetermined location being determined in advance such that the areas H become asymmetric in vertical and horizontal directions in the area G in question; and

contents of image processing carried out on the image data are judged.

9. (currently amended) A program product for making a computer execute a method of embedding digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, in image data, comprising:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

codes for defining an area G consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

codes for allocating each of the area S constituting said area G to some one of: areas $T_1 - T_n$ whose pixel values are changed and areas $H_1 - H_m$ ($1 \leq m$) whose pixel values are not changed;

codes for corresponding each of said $T_1 - T_n$ whose pixel values are changed, to each of said digital watermark information $b_1 - b_n$ and changing the pixel value of each area T according to a bit value;

codes for locating one or more areas $T_1 - T_n$ and one or more areas $H_1 - H_m$ in a predetermined same arrangement in said area G;

codes for locating said area G repeatedly over entire image data, wherein

said location of said areas G thus located repeatedly being independent of said digital watermark information; and

a computer readable storage medium for holding the codes.

10. (currently amended) A program product for making a computer execute a method of embedding digital watermark information $b_1 - b_n$ ($2 \leq n$) in image data, comprising:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

codes for defining an area G consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

codes for allocating each of the areas S constituting said area G to some one of: areas $T_1 - T_n$ whose pixel values are changed, areas $J_1 - J_k$ ($1 \leq k$) in which information $p_1 - p_k$ ($1 \leq k$) specifying an embedding format for embedding said digital watermark information $b_1 - b_n$, a bit value of the digital watermark information being 0 or 1, in said areas $T_1 - T_n$, and areas $H_1 - H_m$ ($1 \leq m$) whose pixel values are not changed;

codes for corresponding each of said $T_1 - T_n$ whose pixel values are changed, to each of said digital watermark information $b_1 - b_n$ and changing the pixel value of each area T according to a bit value;

codes for locating one or more areas $T_1 - T_n$, and areas $J_1 - J_k$ in a predetermined same arrangement in said area G;

codes for locating said area G repeatedly over entire image data, wherein

said location of said area G thus located repeatedly being independent of said digital watermark information; and

a computer readable storage medium for holding the codes.

11. (original) The program product according to Claim 10, further comprising:

codes for embedding said digital watermark information $b_1 - b_n$ by increasing or decreasing pixel data values in the corresponding areas $T_1 - T_n$ according to a bit value (0, 1) of each bit of the digital watermark information $b_1 - b_n$; and

codes for embedding said information $p_1 - p_k$ specifying said embedding format such that said information indicates a pattern of respective increasing/decreasing directions in the areas $T_1 - T_n$ for a bit value of the digital watermark information, in each area G to which the areas $J_1 - J_k$ embedded with said information $p_1 - p_k$ belong.

12. (previously presented) The program product according to Claim 9, wherein:

each of said areas G includes a plurality of said areas $H_1 - H_m$ which have been predetermined in a location so as to be asymmetric in vertical and horizontal directions in the area G in question.

13. (previously presented) A program product for making a computer execute a method of extracting digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

codes for detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S;

codes for recognizing a plurality of areas $T_1 - T_n$ each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas $T_1 - T_n$ being located on said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S;

codes for extracting the digital watermark information $b_1 - b_n$ from the recognized areas $T_1 - T_n$; and

a computer readable storage medium for holding the codes.

14. (previously presented) A program product for making a computer execute a method of extracting digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the

digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

codes for detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S codes for recognizing a plurality of areas G each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S;

codes for extracting, in each of the plurality of areas G recognized, information $p_1 - p_k$ ($1 \leq k$) from areas $J_1 - J_k$ in which said information $p_1 - p_k$ ($1 \leq k$) should be embedded, said information $p_1 - p_k$ specifying an embedding format for embedding said digital watermark information $b_1 - b_n$ respectively in said areas $T_1 - T_n$;

codes for recognizing the embedding format of the digital watermark information $b_1 - b_n$ in the areas $T_1 - T_n$ in the area G in question;

codes for extracting the digital watermark information $b_1 - b_n$ from the areas $T_1 - T_n$ according to the recognized embedding format; and

a computer readable storage medium for holding the codes.

15. (original) The program product according to Claim 14, further comprising:

codes for extracting, for each of the plurality of groups G recognized, the information $p_1 - p_k$ embedded in the areas $J_1 - J_k$ to recognize a pattern of increasing/decreasing directions of pixel data values for a bit value of the digital watermark information, in the area G in question, and to detect each bit value of the digital watermark information $b_1 - b_n$ embedded in the areas $T_1 - T_n$ according to the recognized pattern of increasing/decreasing directions.

16. (original) The program product according to Claim 13, further comprising:

codes for detecting a plurality of areas H from each of the areas G;

codes for comparing the detected areas H with an embedding pattern for the areas H, said embedding pattern being determined in advance such that the areas H become asymmetric in vertical and horizontal directions in the area G in question; and

codes for judging contents of image processing carried out on the image data.

17. (currently amended) An apparatus for embedding digital watermark information $b_1 - b_n$ ($2 \leq n$) in image data, comprising:

a processing part for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

a processing part for defining an area G consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

a processing part for allocating each of the areas S constituting said area G to some one of: areas $T_1 - T_n$ whose pixel values are changed and areas $H_1 - H_m$ ($1 \leq m$) whose pixel values are not changed;

a processing part for corresponding each of said $T_1 - T_n$ whose pixel values are changed, to each of said digital watermark information $b_1 - b_n$ and changing the pixel value of each areas T according to a bit value;

a processing part for locating one or more areas $T_1 - T_n$, and one or more areas $H_1 - H_m$ in a predetermined same arrangement in said area G; and

a processing part for locating said area G repeatedly over entire image data, wherein

said location of said areas G thus located repeatedly being independent of said digital watermark information.

18. (currently amended) An apparatus for embedding digital watermark information $b_1 - b_n$ ($2 \leq n$) in image data, comprising:

a processing part for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

a processing part for defining an area G consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

a processing part for allocating each of the areas S constituting said area G to some one of: areas $T_1 - T_n$ whose pixel values are changed, areas $J_1 - J_k$ ($1 \leq k$) in which information $p_1 - p_k$ ($1 \leq k$) specifying an embedding format for embedding said

digital watermark information $b_1 - b_n$ in said areas $T_1 - T_n$, and areas $H_1 - H_m$ ($1 \leq m$) whose pixel values are not changed;

a processing part for corresponding each of said $T_1 - T_n$ whose pixel values are changed, to each of said digital watermark information $b_1 - b_n$ and changing the pixel value of each area T according to a bit value;

a processing part for locating one or more areas $T_1 - T_n$, one or more areas $J_1 - J_k$ and one or more areas $H_1 - H_m$ in a predetermined same arrangement in said area G; and

a processing part for locating said area G repeatedly over entire image data, wherein

said location of said areas G thus located repeatedly being independent of said digital watermark information.

19. (original) The apparatus for embedding digital watermark information according to Claim 18, further comprising:

a processing part for embedding said digital watermark information $b_1 - b_n$ by increasing or decreasing pixel data values in the corresponding areas $T_1 - T_n$ according to a bit value (0, 1) of each bit of the digital watermark information $b_1 - b_n$; and

a processing part for embedding said information $p_1 - p_k$ specifying said embedding format such that said information indicates a pattern of respective increasing/decreasing directions in the area $T_1 - T_n$ for a bit value of the digital

watermark information, in each area G to which the areas $J_1 - J_k$ embedded with said information $p_1 - p_k$ belong.

20. (previously presented) The apparatus for embedding digital watermark information according to Claim 17, wherein:

each of said areas G includes a plurality of areas $H_1 - H_m$ which have been predetermined in a location so as to be asymmetric in vertical and horizontal directions in the area G in question.

21. (previously presented) An apparatus for extracting digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

a processing part for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

a processing part for detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S;

a processing part for recognizing a plurality of areas $T_1 - T_n$ each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas $T_1 - T_n$ being located on said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S; and

a processing part for extracting the digital watermark information $b_1 - b_n$ from the recognized areas $T_1 - T_n$.

22. (currently amended) An apparatus for extracting digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

a processing part dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

a processing part for detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S;

a processing part for recognizing a plurality of areas G each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas G being located repeatedly over entire ~~on~~ said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S; a processing part for extracting, in each of the plurality of areas G recognized, information $p_1 - p_k$ ($1 \leq k$) from areas J_1 - J_k in which said information $p_1 - p_k$ ($1 \leq k$) should be embedded, said information $p_1 - p_k$ specifying an embedding format for embedding said digital watermark information $b_1 - b_n$ respectively in said areas $T_1 - T_n$;

a processing part for recognizing the embedding format of the digital watermark information $b_1 - b_n$ in the areas $T_1 - T_n$ in the area G in question; and

a processing part for extracting the digital watermark information $b_1 - b_n$ from the areas $T_1 - T_n$, according to the recognized embedding format

wherein said location of said areas G thus located repeatedly being independent of said digital watermark information.

23. (original) The apparatus for extracting digital watermark information according to Claim 22, further comprising:

a processing part for extracting, for each of the plurality of groups G recognized, the information $p_1 - p_k$ embedded in the areas $J_1 - J_k$, to recognize a pattern of increasing/decreasing directions of pixel data values for a bit value of the digital watermark information, in the area G in question, and to detect each bit value of the digital watermark information $b_1 - b_n$ embedded in the areas $T_1 - T_n$, according to the recognized pattern of increasing/decreasing directions.

24. (previously presented) The apparatus for extracting digital watermark information according to Claim 21, further comprising:

a processing part for detecting a plurality of areas H from each of the areas G; and

a processing part for comparing the detected areas H with a predetermined location in the areas $H_1 - H_m$, said predetermined location being determined in advance such that the areas H become asymmetric in vertical and horizontal directions in the area G in question; and

a processing part for judging contents of image processing carried out on the image data.

25. (currently amended) An apparatus for embedding digital watermark information $b_1 - b_n$ ($2 \leq n$) in image data, comprising:

a processor; and

a storage unit for storing codes for making the processor execute a method of embedding the digital watermark information; wherein:

said codes comprises:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

codes for defining a plurality of areas G each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S;

codes for allocating each of the areas S constituting each area G to some one of: areas $T_1 - T_n$ in which said digital watermark information $b_1 - b_n$, a bit value of the digital watermark information being 0 or 1, is respectively embedded, areas $J_1 - J_k$, ($1 \leq k$) in which information $p_1 - p_k$ ($1 \leq k$) specifying a embedding format for embedding said digital watermark information $b_1 - b_n$ in said areas $T_1 - T_n$, and areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded;

codes for locating one or more areas $T_1 - T_n$, one or more areas $J_1 - J_k$, and one or more areas $H_1 - H_m$ in a predetermined same arrangement in each area G; and

codes for locating the plurality of areas G repeatedly over entire image data in a predetermined rule

wherein said location of said areas G thus located repeatedly being independent of said digital watermark information.

26. (currently amended) An apparatus for extracting digital watermark information $b_1 - b_n$ ($2 \leq n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

a processor; and

a storage unit for storing codes for making the processor execute a method of extracting the digital watermark information; wherein:

said codes comprises:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 \leq M, N$) pixels;

codes for detecting areas $H_1 - H_m$ ($1 \leq m$) in which any of bit information 0 and 1 is not embedded, from said plurality of areas S;

codes for recognizing a plurality of areas G each consisting of $P \times Q$ ($1 \leq P, Q$) of the areas S, said plurality of areas G being located repeatedly over entire ~~on~~ said image data, and said recognition being carried out by comparing locations of said detected areas $H_1 - H_m$ on said image data and locations of predetermined areas $H_1 - H_m$ in the areas S; and codes for extracting, in each of the plurality of areas G recognized, information $p_1 - p_k$ ($1 \leq k$) from areas $J_1 - J_k$ in which said

information $p_1 - p_k$ ($1 \leq k$) should be embedded, said information $p_1 - p_k$ specifying an embedding format for embedding said digital watermark information $b_1 - b_n$ respectively in areas $T_1 - T_n$

wherein said location of said areas G thus located repeatedly being independent of said digital watermark information.